CLAIMS

What is claimed is:

1. A method comprising:

generating an index by a content-addressable memory based on an input value;

acquiring a mask value and a data protection field based on the index;

generating a comparison value based on the mask value and the input value; and

comparing the comparison value to the data protection field.

2. The method of claim 1, wherein the data protection field includes a pre-computed data protection result.

3. The method of claim 1, wherein the content-addressable memory includes a ternary content-addressable memory.

4. The method of claim 1, wherein said acquiring the mask value and the data protection field includes a lookup operation on a memory.

5. The method of claim 1, wherein generating the comparison value includes:

masking the input value with the mask value to generate a masked input value; and

applying a data protection function to the masked input value to generate the comparison value.

6. The method of claim 1, wherein generating the comparison value includes:

decoding the mask value to generate a decoded mask value;

masking the input value with the decoded mask value to generate a masked input value; and

applying a data protection function to the masked input value to generate the comparison value.

7 The method of claim 1, wherein generating the comparison value includes:

masking the input value with the mask value to generate a masked input value; and

applying a data protection function to the masked input value and the mask value to generate the comparison value.

8. The method of claim 1, wherein the input value has a plurality of input value bits, and the content-addressable memory includes a plurality of pairs of masks and values with each mask each having a plurality of mask bits and each value having a plurality of value bits; and

wherein said generating the index includes matching the input value with a particular one of the plurality of pairs of masks and values, wherein said matching includes comparing said input value bits whose corresponding said mask bits of the particular one of the plurality of pairs have a scalar value of one with said value bits of the particular one of the plurality of pairs whose corresponding said mask bits of the particular one of the plurality of pairs have a scalar value of one.

9. The method of claim 1, wherein the input value has a plurality of input value bits, and the content-addressable memory includes a plurality of pairs of masks and values with each mask each having a plurality of mask bits and each value having a plurality of value bits; and

wherein said generating the index includes matching the input value with a particular one of the plurality of pairs of masks and values, wherein said matching includes comparing said input value bits whose corresponding said mask bits of the particular one of the plurality of pairs have a scalar value of zero with said value bits of the particular one of the plurality of pairs whose corresponding said mask bits of the particular one of the plurality of pairs have a scalar value of zero.

10. The method of claim 1, further comprising signaling an error condition if the comparison value is not equal to the data protection field.

11. The method of claim 1, wherein said acquiring the mask value includes:

retrieving an encoded mask value from a storage mechanism; and

decoding the encoded mask value to generate the mask value.

12. A computer-readable medium containing computer-readable instructions for performing a set of steps, the set of steps comprising:

retrieving a mask value and a data protection field from a storage based on an index value generated by a content-addressable memory based on an input value;

masking the input value with the mask value to generate a masked input value;

performing a data protection function on the masked input value to generate a comparison result; and

comparing the comparison result with the data protection field.

13. The computer-readable medium of claim 12, wherein the storage includes one or more memory devices.

14. The computer-readable medium of claim 12, wherein the storage includes one or more storage devices.

15. The computer-readable medium of claim 12, wherein the content-addressable memory includes a ternary content-addressable memory.

16. The computer-readable medium of claim 12, wherein the data protection field includes a pre-computed data protection result.

17. The computer-readable medium of claim 12, further indicating an error condition if the comparison value is not equal to the data protection field.

18. An apparatus comprising:

a content-addressable memory configured to receive an input word and to generate an index;

one or more storage mechanisms coupled to the content-addressable memory to receive the index and to produce a mask value and a data protection field;

a masking device coupled to said one or more storage mechanisms to generate a masked result based on the input word and the mask value;

a data protection generator coupled to the masking device to generate a comparison value based on the masked result; and

a comparison mechanism coupled to the data protection generator and said one or more storage mechanisms to compare the comparison value and the data protection field.

19. The apparatus of claim 18, wherein the masking device includes a decoder to decode the mask value.

20. The apparatus of claim 18, wherein the comparison mechanism indicates an error condition if the comparison value is not equal to the data protection field.

21. The apparatus of claim 18, wherein the data protection field includes a pre-computed data protection result.

22. The apparatus of claim 18, wherein the content-addressable memory includes a ternary content-addressable memory.

23. An apparatus comprising:

a content-addressable memory including a plurality of entries, each of the plurality of entries including a value and a data protection field;

a data protection generator, coupled to the content-addressable memory, to receive said value of an identified one of the plurality of entries and to generate a comparison value; and

a comparison mechanism, coupled to the data protection generator and the content-addressable memory, to compare the comparison value and said data protection field of the identified one of the plurality of entries.

24. The apparatus of claim 23, wherein the content-addressable memory includes a binary content-addressable memory.

25. The apparatus of claim 23, wherein, for each of the plurality of entries, said data protection field of a particular entry includes a pre-computed data protection result for said value of the particular entry.

26. A method comprising:

receiving a content-addressable memory index;

extracting a value field and a data protection field from the content-addressable memory index;

performing a data protection function on the value to generate a comparison result; and

comparing the comparison result with the data protection field.

27. The method of claim 26, wherein the content-addressable memory includes a binary content-addressable memory.

28. The method of claim 26, wherein the data protection field includes a pre-computed data protection result.

29. The method of claim 26, further indicating an error condition if the comparison result is not equal to the data protection field.

30. A computer-readable medium containing computer executable instructions for performing the method of claim 26.

31. An apparatus comprising:

a content-addressable memory to receive an input and to generate an index;

a memory, coupled to the content-addressable memory and a comparison mechanism, to receive the index and to generate a data protection field;

a data protection generator, coupled to the content-addressable memory and the comparison mechanism, to receive the index and to generate a comparison value; and

the comparison mechanism to compare the comparison value and the data protection field.

32. The apparatus of claim 31, wherein the content-addressable memory includes a binary content-addressable memory.

33. A method comprising:

generating an index by a content-addressable memory based on an input value;

generating a comparison value based on the index;

acquiring a data protection field based on the index; and

comparing the comparison value to the data protection field.

34. The method of claim 33, wherein the data protection field includes a pre-computed data protection result.

35. The method of claim 33, wherein the content-addressable memory includes a binary content-addressable memory.

36. The method of claim 33, wherein said acquiring the data protection field includes a lookup operation on a memory.

37. The method of claim 33, wherein generating the comparison value includes applying a data protection function to the index.

38. The method of claim 33, further comprising signaling an error condition if the comparison value is not equal to the data protection field.

39. An apparatus comprising:

means for generating an index by a content-addressable memory based on an input value;

means for acquiring a mask value and a data protection field based on the index;

means for generating a comparison value based on the mask value and the input value; and

means for comparing the comparison value to the data protection field.

40. The apparatus of claim 39, wherein the data protection field includes a pre-computed data protection result.

41. The apparatus of claim 39, wherein the content-addressable memory includes a ternary content-addressable memory.

42. The apparatus of claim 39, wherein said means for acquiring the mask value and the data protection field includes means for performing a lookup operation on a memory.

43. The apparatus of claim 39, wherein said means for generating the comparison value includes:

means for masking the input value with the mask value to generate a masked input value; and

means for applying a data protection function to the masked input value to generate the comparison value.

44. The apparatus of claim 39, wherein said means for generating the comparison value includes:

means for decoding the mask value to generate a decoded mask value;

means for masking the input value with the decoded mask value to generate a masked input value; and

means for applying a data protection function to the masked input value to generate the comparison value.

45. The apparatus of claim 39, further comprising means for signaling an error condition if the comparison value is not equal to the data protection field.

46. An apparatus comprising:

means for receiving an input word and for generating an index;

means for receiving the index and for producing a mask value and a data protection field;

means for generating a masked result based on the input word and the mask value;

means for generating a comparison value based on the masked result; and

means for comparing the comparison value and the data protection field.

47. The apparatus of claim 46, wherein said means for generating a masked result includes means for decoding the mask value.

48. The apparatus of claim 46, wherein said means for comparing includes means for indicating an error condition if the comparison value is not equal to the data protection field.

49. The apparatus of claim 46, wherein the data protection field includes a pre-computed data protection result.

50. The apparatus of claim 46, wherein said means for receiving the input word and for generating the index includes a content-addressable memory.

51. The apparatus of claim 46, wherein said means for receiving the input word and for generating the index includes a ternary content-addressable memory.

52. An apparatus comprising:

means for receiving an index and for producing a value and a data protection field;

means for generating a comparison value based on the value; and

means for comparing the comparison value to the data protection field.

53. The apparatus of claim 52, wherein said means for receiving the index and for producing the value and the data protection field includes a binary content-addressable memory.

54. The apparatus of claim 52, wherein the data protection field includes a pre-computed data protection result for the value.

55. An apparatus comprising:

means for generating an index based on an input value;

means for generating a comparison value based on the index;

means for acquiring a data protection field based on the index; and

means for comparing the comparison value to the data protection field.

56. The apparatus of claim 55, wherein said means for generating the index based on the input value includes a binary content-addressable memory.

57. The apparatus of claim 55, wherein said means for acquiring the data protection field includes means for performing lookup operation on a memory.

58. The apparatus of claim 55, further comprising means for signaling an error condition if the comparison value is not equal to the data protection field.